

IT IS CLAIMED:

1. A method for determining binding of a species at a surface having a local environment at a given pH or surface potential, wherein said binding is effective to alter said pH or potential, the method comprising:
 - stably incorporating at said surface a probe which comprises a pH- or potential-sensitive fluorophore attached to a steroid or to a lipid having at least two alkyl or alkenyl chains at least 14 carbon atoms in length, and
 - observing a change in a fluorescent property of said fluorophore upon binding or dissociation of said species at said surface.
2. The method of claim 1, wherein said surface is the surface of a lipid bilayer.
3. The method of claim 1, wherein said fluorophore is selected from the group consisting of a pH-sensitive lissamine rhodamine compound, 7-hydroxycoumarin, fluorescein, and pH- or potential-sensitive derivatives thereof.
4. The method of claim 1, wherein said lipid is a phospholipid.
5. The method of claim 1, wherein said species is a biomolecule having groups which are positively or negatively charged at a selected pH between about 2.0 and 12.0.
6. The method of claim 5, wherein said groups are positively or negatively charged at a selected pH between about 4.5 and 7.5.
7. The method of claim 5, wherein said biomolecule is a nucleic acid.
8. The method of claim 5, wherein said biomolecule is a protein comprising amino acids with acidic or basic side groups.
9. The method of claim 1, wherein said surface comprises groups which are positively or negatively charged at a selected pH between about 2.0 and 12.0.
10. The method of claim 9, wherein said groups are positively or negatively charged at a selected pH between about 4.5 and 7.5.
11. The method of claim 2, wherein said lipid bilayer comprises a lipid having a cationic head group.

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12. The method of claim 1 wherein, upon said incorporating, said fluorophore is separated from said surface by a distance equal to or less than 15 nm.

13. The method of claim 1, wherein said lipid or steroid is attached to two or more fluorophores.

14. A pH- or potential-sensitive probe consisting of 7-hydroxycoumarin conjugated at the 3-, 4-, 5-, 6-, or 8-position to a lipid having at least two alkyl or alkenyl chains at least 14 carbon atoms in length.

15. The probe of claim 14, wherein said lipid is a dialkyl or dialkenyl phosphatidyl ethanolamine.

16. The probe of claim 14, consisting of 7-hydroxycoumarin conjugated via a 3-carboxamide linkage to the head group nitrogen of a dialkyl or dialkenyl phosphatidyl ethanolamine.

17. A method for determining binding of a species at a polymer surface having a local environment at a given pH or surface potential, wherein said binding is effective to alter said pH or potential, the method comprising:

stably incorporating at said polymer surface a pH- or potential-sensitive fluorophore, and

observing a change in a fluorescent property of said fluorophore upon binding or dissociation

of said species at said surface.

18. The method of claim 17, wherein said fluorophore is covalently bound to said polymer.

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